



City of Santa Barbara

Climate Action Plan

September 2012





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Executive Summary

The Executive Summary provides a brief recap of the Climate Plan, including:

- *Introduction:* plan objectives, content, and background
- *Reduction of Carbon Emissions that Contribute to Climate Change:* future citywide carbon emissions targets; inventories; and forecasts
- *Adaptation to Climate Change:* types of forecasted future climate changes
- *Summary of Climate Plan Strategies:* listing of measures for carbon emissions reduction and adaptation planning.
- *Plan Implementation, Monitoring, and Update*



Introduction

The Santa Barbara Climate Action Plan addresses climate change issues for the City of Santa Barbara community in the period to the year 2030, in accordance with directives of the Santa Barbara General Plan and the California Global Warming Solutions Act (AB 32).

Purpose

Climate plan purposes: (1) reduce the rate of carbon emissions generated within the Santa Barbara community; and (2) plan for adaptation of Santa Barbara to climate changes.

Content

Carbon emissions reduction: The plan identifies carbon emissions targets for the years 2020 and 2030; citywide emissions inventories and forecasts; existing City measures in place and future strategies for reducing carbon emissions in the areas of energy efficiency and green building, renewable energy, travel and land use, vegetation, waste reduction, and water conservation.

Climate adaptation: The plan describes the types of climate changes likely to affect Santa Barbara in the future, including more frequent extreme weather events (heat waves, droughts, wildfires, winter storms, flooding); accelerated coastal erosion; changes to water supply, increased air and water pollution; geographic shifts of habitats and wildlife; and effects on local economies such as fisheries and tourism. Measures to plan for future adaptation are identified.

Background - climate science

Accelerated changes are occurring to measures of global climate, such as concentrations of carbon dioxide and other “greenhouse gases” in the atmosphere; rising average air and ocean temperatures; substantial reduction in the thickness of arctic ice sheets; and rising sea levels.

There is scientific consensus that the accelerated rates of change are the result of high and increasing amounts of greenhouse gases emitted into the atmosphere by human activities, especially combustion of fossil fuels for power generation and transportation fuel.

Weather processes are complex and there are uncertainties in predicting the exact rates, extents, and locational patterns of climate changes, but the types, trends, and accelerated pace of changes are clear.

Benefits

Actions to reduce carbon emissions and plan for adaptation involve costs, but will also have benefits to Santa Barbara not only in addressing climate change, but with other cost, economic, security, health, resource, and quality of life benefits.

Reduction of Carbon Emissions that Contribute to Climate Change

By reducing the amount of carbon emissions generated in the Santa Barbara community together with communities across the world, the extent of future climate change and severity of its impacts may be lessened.

Santa Barbara carbon emissions reduction targets

The carbon emission targets are consistent with established State and regional targets, and with City General Plan policies directing sustainability and climate protection measures. The targets are identified in metric tons of carbon dioxide equivalent (MTCO₂e).

- Year 2020 target for total carbon emissions: Reduction of overall annual Santa Barbara citywide carbon emissions to 1990 level by the year 2020, per the State AB 32 target.

[1990 level is estimated at 724,389 MTCO₂e.]

- Year 2020 and 2030 targets for per capita vehicle carbon emissions: Zero increase in annual 2005 average per capita level of carbon emissions from passenger vehicle and light truck travel in 2020 and 2030, per the SB 375 State and regional County targets.

[2005 level is estimated at 4.413 MTCO₂e/person.]

Summary of citywide emissions inventories and forecasts

The following summary chart (ES-1) shows that the Santa Barbara community has already met the 2020 and 2030 carbon emissions targets. With continued implementation of existing carbon-reducing measures in place and identified future measures, these targets will continue to be met and surpassed through in the years 2030 and 2030.

Figure ES-1 – Summary of Santa Barbara Carbon Emissions Forecasts	
Forecast Scenario	Annual Emissions (Metric tons CO₂e)
<i>Citywide Total Emissions – Year 2020 (AB 32 Target)</i>	
2007 citywide emissions inventory (baseline)	719,833
2020 target for total emissions (1990 level)	724,388
2020 emissions forecast –“business as usual” (with General Plan growth)	861,326
Emissions reductions needed to meet 2020 target	-136,938
Emissions reductions from State legislative measures	-179,580
2020 emissions forecast with State reductions	681,746
Emissions reductions from City climate plan	-138,561
2020 emissions forecast with State and City climate plan reductions	543,185
25% below 1990 target level	
<i>Per Capita Vehicle Emissions – Year 2020 (SB 375 Target)</i>	
2020 population forecast	92,064
2020 target for per capita on-road vehicle emissions (2005 level)	4.413/person
2020 vehicle emissions forecast – business as usual	5.965/person
Vehicle emissions reduction needed to meet 2020 target	-1.552/person
Vehicle emissions reductions from State legislative measures	-1.693/person
2020 vehicle emissions forecast – with State reductions	4.272/person
Vehicle emissions reduction from City climate plan	-1.176/person
2020 vehicle emissions forecast – with State and City reductions	3.096/person
30% below 2005 target level	

Figure ES-1 (cont.)	Forecast Scenario	Annual Emissions (Metric tons CO ₂ e)
Per Capita Vehicle Emissions – Year 2030 (SB 375 Target¹)		
2030 population forecast		95,110
2030 target for per capita on-road vehicle emissions (2005 level)		4.413/person
2030 vehicle emissions forecast - business as usual		6.525/person
Vehicle emissions reduction needed to meet 2030 target		-2,112/person
Vehicle emissions reductions from State legislative measures		-2.559/person
2030 vehicle emissions forecast with State reductions		3.966/person
Vehicle emissions reductions from City climate plan measures		-2.123/person
2030 vehicle emissions forecast with State & City Climate Plan reductions		1.843/person
58% below 2005 target level		

¹ The City climate plan has a planning horizon to 2030. The 2030 vehicle emissions target is a proxy for meeting the regional 2035 vehicle emissions target.

Carbon emissions reduction strategies

A summary chart of carbon-reducing strategies is provided in Figure ES-3.

Adaptation to Climate Change

High atmospheric carbon dioxide levels are already in place and remain in the atmosphere for decades. Resulting accelerated climate changes are projected to occur over the coming decades despite efforts now to reduce the rate of manmade generation of carbon emissions.

Climate change effects and Santa Barbara vulnerability

The following chart summarizes the types of climate change effects anticipated to occur in the Santa Barbara area over the coming decades.

Figure ES-2 Summary of Potential Future Climate Change Effects	
Temperature, rainfall, extreme weather	
Temperature	2050 projection (Calif.): average temperature increases in the range of 1.82 – 5.4 degrees F; more frequent heat waves.
Precipitation	2050 projection (Calif.): average rainfall decrease of 12 – 35%; less snow pack, more droughts
Wildfires	2050 projection (Calif.): greater wildfire risk (warmer, drier conditions)
Storm events & flooding	2050 projection (Calif.): more erratic weather patterns and extreme rainstorm events, with associated storm damage and flooding.
Pests & vectors	2050 projection (Calif.): potential for altered transmission patterns for pests, vectors, and diseases.
Air pollution	2050 projection (Calif.): increased smog production and changes to pollen production; reactive nitrogen disposition affecting plants
Water pollution	2050 projection (Calif.): increased risk for pollution of streams (higher temperatures; urban runoff during intense storms); seawater intrusion into groundwater; ocean acidification affecting sea creatures.

Figure ES-2 (cont.) Summary of Potential Future Climate Change Effects	
Sea level rise	
Sea level rise	2030 projection (Calif.): average 7 inches rise; range 5-8 inches 2050 projection (Calif.): average 14 inches; range 10-17 inches 2070 projection (Calif.): medium average 24 inches; range 17-39 inches 2100 projection (Calif.): medium average 47 inches; range 31-69 inches
Storm damage	2050, 2100 projections (SB): sea level rise exacerbates high-magnitude storm events, affecting wave damage, flooding, erosion 2050: high probability and magnitude in Santa Barbara 2100: very high magnitude probability and magnitude in SB
Flooding and inundation	2050, 2100 projections (SB): increased areas subject to 100-year flooding; permanent inundation of some low-lying areas 2050 probability and magnitude moderate for City, high for Airport 2100 probability and magnitude high for City, very high for Airport
Beach retreat	2050, 2100 projections (SB): potential erosion or loss of beaches 2050 probability and magnitude low for Santa Barbara 2100 probability and magnitude moderate to high for City beaches
Coastal cliff erosion	2050 projection (SB): moderate probability of substantial increase in erosion rate (doubled from current 6-12 in/yr to 12-24 in/year) 2100 projection (SB): probability and vulnerability high of increased erosion rates, threatening cliff-top homes.
Tsunami	2050, 2100 projection (SB): very low probability of occurrence continues, with low risk of damage
Public services	
Water supply	2030 projection (SB): adequate SB water supply 2050, 2100 projections (Calif.): increased pressures on statewide water supplies due to less rainfall and less water storage as snow pack, with increased irrigation demand and increased population
Agriculture and food supply	2050, 2100 projections (Calif.): alterations in crop yields, growing seasons, and pest ranges due to changes in temperature, rainfall, extreme weather, and water supply.
Energy demand	2050, 2100 projections (Calif.): increased statewide energy demand with population increase, more demand for cooling, peak summer demand, utilities, water transport, and industries.
Biological resources	
Natural habitats and species	2050, 2100 projections (Calif.): varied species responses to changes in temperatures, rainfall, weather patterns, extreme events, wildfire, rising sea levels, coastal erosion, and air and water pollution. Individual species may adapt, survive in reduced ranges, migrate, or not survive. General trend to move northward anticipated.
Local economies	
Fisheries and tourism	2050, 2100 projections (Calif.): marine habitats changes could affect fishing industry. Weather events, coastal erosion could affect tourism.

Summary of Climate Plan Strategies

Figure ES-3 provides a summary listing of strategies identified to reduce carbon emissions.

Figure ES-3 Summary of Climate Plan Emission Reduction Strategies			
CLIMATE PLAN STRATEGY	TARGET YEAR	CLIMATE PLAN STRATEGY	TARGET YEAR
<i>Energy efficiency and green building measures</i>		35. Development impact fees	2015
1. Energy-efficient City facilities	ongoing	36. Street widths	ongoing
2. Recreational field lighting efficiency	2015	37. New development vehicle emissions	2015
3. Energy-efficient buildings–voluntary actions	ongoing	38. Marine shipping emissions	ongoing
4. Energy-efficient buildings–further actions	2025	<i>Vegetation measures</i>	
5. Green building	ongoing	39. Tree planting	2030
<i>Renewable energy measures</i>		40. Street trees	2015, ongoing
6. Hydroelectric plant re-commissioning	2015	41. Tree and landscaping protection	2015
7. Solar photovoltaic project at airport	2015	42. Urban heat island effect	2020
8. Community choice aggregation	2030	43. Regional open space preservation	ongoing
9. Alternative/advanced fuels	2020, 2030	<i>Waste reduction measures</i>	
10. Alternative fuel infrastructure	2015	44. City business purchasing guidelines	2015
11. Small wind generators	2020	45. City facilities recycling	2015
12. Facilitate renewable energy technologies	2020	46. Electronic processes	2015
13. Solar energy	ongoing	47. City coordination with region	2020
<i>Travel and land use measures</i>		48. Waste-to-energy facility at landfill	2015
14. Fleet vehicles	ongoing	49. Communitywide waste diversion	2020
15. City employee travel changes	ongoing	50. Regional material recovery facility	2015
16. Mixed use land use policies	2015	51. Waste audit information for business	2015
17. Sustainable neighborhood plans	2020, 2030	52. Recycling education campaigns	2015
18. Experimental development	2015	53. Single-use packaging reduction	2015
19. Complementary land uses	2020	54. Business & MF recycling ordinance	2015
20. Electric vehicle charging stations	2015	55. Construction waste enforcement	2015
21. Pedestrian infrastructure	ongoing	56. Increased recyclables sorting	2015
22. Bicycle infrastructure improvements	ongoing	57. School waste diversion	2015
23. Personal transportation	ongoing	58. Materials reuse/recycling for builders	2015
24. Inter-model connections	ongoing	59. Building space guidelines for waste	2015
25. Optimize roadway capacity, flow	ongoing	60. Additional recycling materials	2020
26. Mid-block traffic improvements	ongoing	61. Additional green waste capacity	2020
27. Regional transportation and transit	ongoing	62. Additional recycling in public places	2020
28. Vehicle speeds	2015	63. Additional composting	2020
29. Bus pull-out right of way	2015	64. Single-use bag reduction	2015
30. Circulation improvements	ongoing	<i>Water conservation measures</i>	
31. Transit passes	ongoing	65. City facilities – water conservation	ongoing
32. Parking policies	ongoing	66. Community water conservation	2015, ongoing
33. Car-pooling and telecommuting	ongoing	67. Recycled water	2020, 2030
34. Car-sharing	ongoing	68. On-site water storage and reuse	2020

Figure ES-4 provides a summary list of strategies for climate change adaptation planning.

ES-4 Summary of Climate Plan Adaptation Planning Strategies			
Climate Plan Strategy	Target year	Climate Plan Strategy	Target Year
<i>Climate change adaptation planning</i>		85. Sea level rise adaptation	2020
69. Planning for adaptation	2020, 2030	86. Future inundation	2020
70. Coordination of climate planning efforts	ongoing	87. Bluff retreat guidelines	2015
<i>Emergency preparedness</i>		88. Cliff erosion policies	2020
71. Emergency response strategies	2015	89. Shoreline management plan	2020
72. Emergency workforce	2015	90. Beach erosion policies	2020
73. Public education for emergencies	2015	91. Coastal ecosystems study	2020
74. People with disabilities	2015	<i>Public services</i>	
75. Community resilience planning	2020	92. Water supply planning	2015, ongoing
<i>Wildfire, flooding, water quality</i>		93. Regional cooperation - water supply	ongoing
76. Residential development – high fire hazard	2015	94. Local food cultivation	2030
77. Fire prevention and creek restoration	2015	95. Community gardens	2030
78. Water system improvement for firefighting	ongoing	96. Regional agriculture	ongoing
79. Private water supplies for firefighting	ongoing	<i>Biological resources</i>	
80. Floodplain mapping update	2020	97. Wildlife and habitat protection	2020, ongoing
81. Creek resources and water quality	2025, ongoing	98. Open space connectivity and trails	2020, ongoing
<i>Coastal vulnerability and adaptation planning</i>		99. Creek protection, restoration	2020, ongoing
82. Sea level monitoring, data, analysis	2020	<i>Local economies</i>	
83. Sea level risk assessment and vulnerability	2020	100. Coordinate with local business	2015, ongoing
84. Incorporate adaptation in development	2015, ongoing		

Plan Implementation, Monitoring & Update

Implementation

Plan strategies will be undertaken by City departments, joint efforts with the private sector business, and through development permitting. Measures will be taken up whenever possible as part of ongoing City operations, as budgets allow. Grant funding will continue to be pursued to assist in financing.

Environmental review

The climate plan provides a refined analysis that updates the 2010 General Plan Program EIR analysis. Upon adoption, the climate plan will function as a cumulative mitigation program for climate change effects in the City of Santa Barbara.

Monitoring & plan updates

Climate plan implementation monitoring and reporting will be coordinated with the General Plan Adaptive Management Program under development. Update reports on the citywide carbon emissions inventory and climate change information will also be provided in 2015, 2020, 2025, and 2030. The next climate plan update will be slated for 2030.

1.0 Introduction

This Santa Barbara climate action plan is prepared to address climate change issues in the period to the year 2030, in accordance with directives of the Santa Barbara General Plan and the Global Warming Solutions Act (AB 32) adopted by the California Legislature in 2006.

The Introduction section presents the following information:

- 1.1 *Purpose, Content, & Process*: Identifies plan objectives, summarizes content, and describes plan preparation and adoption process.
- 1.2 *Background*: Describes overall science findings of climate changes; legislative and policy context for climate change planning; regional efforts underway; and other benefits of climate protection measures.



1.1 Purpose, Content & Process

1.1.1 Plan purpose

The scope and nature of global climate change requires that every community take actions toward lowering its contribution to global carbon emissions or “greenhouse gases” that are cumulatively resulting in accelerated climate changes. Communities also need to plan ahead for adaptation to the effects of climate change, such as extreme weather and sea level rise.

Actions to reduce the extent of climate change effects will involve costs, but will also have other cost, economic, security, health, resource, and quality of life benefits to the Santa Barbara community, and are consistent with long-time City policies and community values.

This Santa Barbara climate action plan is prepared to address climate change issues in the period to the year 2030, in accordance with directives of the Santa Barbara General Plan and the Global Warming Solutions Act (AB 32) adopted by the California Legislature in 2006.

The overall purposes of this climate plan are to:

- Reduce the rate of carbon emissions generation within the Santa Barbara community, together with the South Coast region and communities worldwide, to lessen the extent of climate change and severity of its effects, and
- Plan for adapting Santa Barbara to future climate change effects.

1.1.2 Plan content

Section 1 of the Plan, *Introduction*, identifies the purpose of the plan; summarizes plan content and processes for public input and City adoption; and provides background information on climate science findings, legislative and policy context, South Coast regional efforts, and benefits of climate protection measures.

Section 2, *Carbon Emissions Reduction*, includes citywide carbon emissions targets for 2020 and 2030; a communitywide inventory of carbon emissions in Santa Barbara and estimated future emissions forecasts; emissions reduction targets; and existing measures in place and future action strategies for reducing communitywide carbon emissions. Emissions reduction measures are identified in the areas of energy efficiency and green building, renewable energy, travel and land use, vegetation and open space, waste reduction, and water conservation.

Section 3, *Adaptation to Climate Change*, describes types of potential climate change effects and potential vulnerability of Santa Barbara. Examples are extreme weather events, flooding, coastal erosion, wildlife and vegetation changes, and changes affecting local economies. Measures to plan for adaptation to future climate changes are identified.

Section 4, *Plan Implementation, Monitoring, and Update*, summarizes measures to be taken through City operations, development permitting, and environmental review to implement the plan strategies. Processes are identified for monitoring and reporting on the implementation status of plan actions, carbon emissions level changes, and measures of climate change effects, and to periodically update targets and action measures.

Section 5, *References*, identifies plan preparers and source document references.

1.1.3 Process for plan preparation, public review, & adoption

Plan preparation

The Climate Plan was prepared by staff of the City Community Development Department/ Planning Division, with assistance from other City divisions and departments, including the Building & Safety Division, and the Public Works, Parks & Recreation, Waterfront, Airport, and Fire Departments. Assistance on the carbon emissions inventories and projections was provided by the firm AMEC Environment and Infrastructure, Inc. under contract to the City.

Existing City policy documents including the General Plan and Municipal Code informed the development of proposed policies and future action measures. An assessment of Santa Barbara's vulnerability to climate change impacts associated with sea level rise was provided by the U.C. Santa Cruz Institute of Marine Sciences. The Program EIR for the *Plan Santa Barbara* General Plan Update, State climate change guidelines, reports from Santa Barbara community organizations, and other informational sources were also used in preparing the carbon emissions inventory and identifying strategies (see Section 5, *References*).

Environmental review of the Plan under the California Environmental Quality Act (CEQA) tiered off of the full-scope, citywide Environmental Impact Report certified for the City's *Plan Santa Barbara* General Plan update.

Public review period

The draft City of Santa Barbara Climate Plan was issued for a 45-day public review and comment period in June-July 2012. Notification of the public review period was provided in the local media, and mailed to agencies and community organizations.

The plan documents are available on-line at the City web site at www.santabarbaraca.gov, and are available for review at the City Planning Division office at 630 Garden Street.

A public hearing before the City Planning Commission was held to provide an additional opportunity for input from the public and Commission. During the review period, informational reports were also provided to City Council and other City advisory boards.

Plan adoption process

Following the public review period, a proposed final draft Climate Plan is prepared and forwarded to City Council for their consideration and adoption at a noticed public hearing.

Plan implementation, monitoring, and update

Upon adoption, a variety of City departments together with the community at large will implement the plan, as identified in the individual action strategies.

As described in Section 4, the plan also provides for monitoring and reporting on the implementation of action measures for carbon emissions reduction and adaptation planning, citywide carbon emissions levels, and measures of climate change. The plan will be slated for periodic update.

1.2 Background

1.2.1 Climate science findings

The world's scientists and science institutes have a clear consensus that accelerating changes are occurring to measures of global climate. Evidence includes concentrations of carbon dioxide and other "greenhouse gases" in the atmosphere; rising average global air temperature; rising average surface temperature of the oceans (which affects extreme weather); substantial reduction in the thickness of arctic ice sheets; and rising average sea levels (*Intergovernmental Panel on Climate Change*).

These changes are already destabilizing climate processes, and over the coming decades are forecasted to create increasingly serious effects worldwide on public health and safety, resources and environment, and economies.

The following effects of climate change can be expected to occur in Santa Barbara in future decades:

- more frequent extreme weather events such as heat waves, droughts, wildfires, wind, severe winter storms, and flooding,
- accelerated coastal erosion and inundation of some coastal areas due to sea level rise
- changes to water supply from more winter runoff and less spring snow melt
- increased smog pollution and water pollution
- geographic shifts and harm to wildlife and plant species and their associated habitats
- changes to disease transmission and pest epidemics
- effects on local economies such as fisheries, tourism, and recreation

There is also scientific consensus that these accelerated climate changes are the result of the increasing worldwide amounts of greenhouse gases including carbon dioxide that are emitted into the atmosphere by human activities, such as from combustion of fossil fuels for electrical generation and transportation fuel.

These gases act like a greenhouse to trap heat in the earth's atmosphere. They absorb radiation and release it as heat to maintain the temperature of the planet. But the balance of gases in the atmosphere is upset, and the increased greenhouse gas content causes excess heat to be retained. Past weather patterns of heating and cooling since ancient times have involved CO₂ levels gradually ranging between 180 and 280 parts per million over thousands of years. The CO₂ level has now been increased to more than 380 ppm within just a few hundred years and continues to increase rapidly.

Weather processes are complex and there are uncertainties in predicting the exact rates, locational patterns, and extent of climate changes, but the types, trends, and unnatural accelerated pace of changes that are occurring are clear.



The U.S. Mayors Climate Protection Agreement
(As endorsed by the 73rd Annual U.S. Conference of Mayors meeting, Chicago 2005)

- A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;
- B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that 1) includes clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and
- C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:
 1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
 2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
 3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
 4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
 5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
 6. Purchase only Energy Star equipment and appliances for City use;
 7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
 8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
 9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
 10. Increase recycling rates in City operations and in the community;
 11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO₂; and
 12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

Figure 1-1 2005 U.S. Mayors Climate Protection Agreement

1.2.2 Legislative and policy context

Throughout the world, individuals, groups, communities, industries, and governments are working to identify and implement measures that can reduce greenhouse gas emissions, to lessen the future extent of climate change and therefore the extent and severity of its effects.

Mayors' 2005 Climate Protection Agreement

In 2005, the U. S. Mayors' Climate Protection Agreement was endorsed by then-Mayor Marty Blum of Santa Barbara along with mayors of 1054 other cities across the nation representing a population of approximately 88,500,000 (see Figure 1-1).

The Agreement directed that cities work to meet or surpass the international carbon emission reduction targets identified in the Kyoto Protocol. The targets identified reduction of annual carbon emissions to 7% below 1990 levels by 2012, through changes in City government operations as well as with policies for the larger community pertaining to energy, land use, transportation, vegetation, waste, and water.

Since that time, concerted efforts by Santa Barbara City departments resulted in already surpassing the Kyoto carbon emission reduction targets for City government operations. In 2007 Santa Barbara certified its first annual greenhouse gas emissions inventory for City operations through the California Climate Action Registry, one of the first cities in the nation to do so. The 2008 inventory demonstrated that City operations had achieved and surpassed the Kyoto Protocol target. Annual carbon emissions for 2010 City operations were more than 16% below 1990 levels.

Efforts within the larger Santa Barbara community have also been continuing to implement measures that reduce carbon emissions (see further discussion in Section 2.3 Carbon Emission Reduction Strategies.)

Governor's 2005 Executive Order

Also in 2005, then-Governor Schwarzenegger signed Executive Order (EO) S-3-50 establishing carbon emission reduction targets for California that called for a statewide reduction to year 2000 emission levels by 2010, a reduction to 1990 levels by 2020, and a reduction to 80% below 1990 levels by 2050.

AB 32: 2006 Global Warming Solutions Act

To implement the State EO S-3-50 carbon emission reduction target for the year 2020 (reduction to 1990 levels), the California Legislature adopted Assembly Bill (AB) 32, which directed the California Air Resources Board (CARB) to develop a Scoping Plan to identify carbon emission reduction measures that could be taken by different economic sectors. The year 2020 target to reduce to 1990 levels was quantified to reflect an estimated 15% reduction from 2005 levels.

The 2008 Scoping Plan and 2011 Scoping Plan Supplement identify suggested carbon emission reduction measures and their estimated effectiveness in meeting California's reduction goals.

Some of the measures would be implemented through State action (e.g., vehicle emissions standards; emissions cap-and-trade program), some measures through specific economic sectors (e.g., industrial and agricultural emissions), and others through local governments, community actions, and individuals. (See Figure 1-2 for summary of planned State actions).

Figure 1-2 Planned State Actions for Carbon Emissions Reduction
Emissions Cap-and-Trade program and complementary measures
Vehicle standards (Pavley I and II standards – light-duty vehicles)
Energy efficiency (building/appliance efficiency; increase combined heat and power (CHP) generation by 30,000 GWh); solar water heating.
Renewable energy (renewables portfolio standard: 33% by 2020)
Fuel standard (low carbon fuel standard)
Regional transportation (regional vehicle carbon emissions targets)
Goods movement (ship electrification at ports; system-wide efficiency improvements)
Solar energy (million solar roofs)
Medium/heavy duty vehicles (aerodynamic efficiency; vehicle hybridization)
Rail (high speed rail project)
Industrial (refinery measures; energy efficiency and co-benefit audits)
Un-Capped sources and sectors
High global warming activities (gas measures)
Trees (sustainable forests)
Oil and gas (extraction and transmission)
Recycling and waste (landfill methane capture)

[Calif. Air Resources Board]

Suggested local government and community measures identified in the State Scoping Plan center around the following actions:

- *improve energy efficiency* to reduce carbon emissions associated with electricity generated from fossil fuel combustion;
- *increase the use of alternative energy sources* such as solar power to reduce carbon emissions from power generation;
- *use “green” building designs and products* that reduce carbon emissions;
- *reduce passenger vehicle trips and mileage* to reduce fuel combustion carbon emissions;
- *maintain or increase vegetation* that sequesters carbon dioxide;
- *reduce solid waste and increase reuse and recycling* to reduce carbon emissions generated from materials production and landfills; and
- *increase water conservation* to reduce carbon emissions associated with energy used in water supply management.

Other State climate change legislation

Senate Bill (SB) 375 (2008) addresses the portion of AB 32 pertaining to reduction of passenger vehicle carbon emissions. The legislation directs the coordination of transportation, land use, housing, and employment planning at the regional level (e.g., Santa Barbara County) to help reduce vehicle miles travelled (see further discussion below in Section 1.2.3 Regional Efforts).

SB 97 (2007) directs California Environmental Quality Act (CEQA) and CEQA Guidelines amendments that require environmental review of individual development projects and other activities to include analysis of climate change impacts and mitigation to reduce carbon emissions. This also establishes that public agencies may provide for a communitywide emissions mitigation program through an adopted climate action plan. SB 226 (2011) was also adopted to provide for streamlining of environmental review procedures for in-fill development projects that are expected to limit greenhouse gas generation.

Other California legislation pertaining to climate change since the year 2000 addresses carbon emissions inventories and registries; vehicle emissions standards (2002 AB 1493 Pavley); electricity carbon standards; carbon dioxide sequestration; waste heat carbon emissions reduction; water efficiency in building standards; solar water heating; lighting efficiency; renewable energy resources; water conservation; solar energy; government motor vehicle fleets; and alternative fuels and vehicle technologies.

Federal activities and regulations

In 1992, the United States signed and ratified the United Nations Framework Convention on Climate Change, which identified the eventual objective to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with climate systems from human activities.

On April 2, 2007, the Supreme Court found that greenhouse gases, including carbon dioxide, are air pollutants covered by the Federal Clean Air Act (*Massachusetts v. EPA*, 549 U.S. 497 (2007)). The U.S. Environmental Protection Agency (US EPA) is the Federal agency responsible for implementing the Clean Air Act.

In January 2011, US EPA rules went into effect for the largest industrial facilities, such as power plants and refineries, which together generate about 70 percent of greenhouse gas emissions from stationary sources nationally. Under these regulations, large facilities require permits covering greenhouse gas emissions as part of existing Clean Air Act permitting programs (New Source Review/Prevention of Significant Deterioration, and Title V Operating Permits). Federal vehicle regulations in 2012 require doubling of average gas mileage to 54.4 miles per gallon by 2025 for new passenger vehicles sold.

The Federal government has taken a number of other actions in recent years that support energy conservation and carbon emissions reduction, including the following:

- U.S. Global Change Research Program (1990)
- Recovery Act investment of \$90 billion in clean energy (2010)
- U.S. government greenhouse gas emissions inventory (2010)

- Fuel economy standards for model year 2012-2016 vehicles (2011)
- Inventory of all large sources of carbon emissions initiated (2011)
- Federal agencies were directed to reduce carbon emissions from direct sources (building energy, vehicle fuel combustion) by 28% by 2020, and from indirect sources (employee travel and commuting) by 13% by 2020. (2011)

State & Federal climate change adaptation activities

Federal and State governments are also recognizing that communities need to begin planning for adaptation to climate changes.

A Federal interagency task force report identified recommendations for a national climate adaptation strategy (CEQ October 2010), including improving local accessibility to scientific information, and building partnerships with local agencies for management of places and infrastructure affected by climate change.

Governor's Executive Order S-13-08 directed State planning efforts for climate change adaptation, including sea level rise studies, assessment of transportation system vulnerability to sea level rise, and preparation of an adaptation strategy report.

The 2009 California Climate Adaptation Strategy report addresses issues of public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forestry, and transportation and energy infrastructure.

In 2011, the California Energy Commission also launched the Cal-Adapt.org web site that provides scientific information and interactive tools to assist in planning for climate change adaptation.

1.2.3 Regional efforts

Reducing vehicle emissions

With an established land use and transportation pattern oriented to individual vehicle travel, it is a challenge throughout California to identify ways to reduce vehicular carbon emissions.

Efforts by the State include establishing more stringent vehicle emission standards, requiring reduced emissions in government fleets, and providing funding support for alternative fuel and vehicle technologies. Industry efforts continue toward developing alternative fuel vehicles and low-emission vehicles.

In addition, State legislation SB 375 directs efforts by regional Metropolitan Planning Organizations (MPOs) throughout the State to find ways to reduce vehicle miles travelled through the development of Sustainable Communities Strategies that coordinate regional transportation, land use, housing, and employment planning.

The Santa Barbara County Association of Governments (SBCAG), which includes representatives of each of the cities and the County, is engaged in developing a Sustainable Communities Strategy for the Santa Barbara County region.

Per AB 375 requirements, the California Air Resources Board (CARB) identified per capita annual vehicle miles reduction targets for each MPO region of the State. The primary focus for statewide reductions was identified to be the large metropolitan areas that are responsible for the majority of the State's vehicle carbon emissions.

The smallest six MPOs, which include Santa Barbara County, together account for only about 5% of the State's vehicle miles travelled and associated carbon emissions. In 2010, SBCAG and CARB adopted regional targets for the Santa Barbara County region. The established targets for both the years 2020 and 2035 are zero net increase in per capita annual vehicular carbon emissions from 2005 levels within Santa Barbara County.

Air district

Santa Barbara County Air Pollution Control District activities related to climate change and greenhouse gas emissions include the following:

- Incorporation of greenhouse gas emissions into large industrial source permits as required by federal law
- Updating and refining the District's countywide greenhouse gas emissions inventory
- Working with individual jurisdictions to quantify and mitigate greenhouse gas emissions associated with development projects
- Participation in working groups to update and improve greenhouse gas quantification and mitigation tools statewide
- Working with the California Air Resources Board to implement AB 32 scoping plan measures as necessary
- Updated environmental review guidelines that address carbon emissions (*Scope and Content of Environmental Review Documents, December 2011*), and held a public workshop to discuss development of greenhouse gas emissions thresholds, including options for numeric thresholds for stationary sources, for use in evaluating environmental impacts of projects within Santa Barbara County..

Regional climate change adaptation planning

In 2011, the County of Santa Barbara worked with cities, as well as the Federal Emergency Management Agency (FEMA) and Cal EMA, to develop an updated Multi-Jurisdiction Multi-Hazard Mitigation Plan for Santa Barbara County under provisions of the Federal Disaster Mitigation Act of 2000. The Plan identifies local vulnerability to flooding, wildfire, earthquakes, tsunamis, landslides, coastal erosion, and dam failure, and establishes pre-planning measures that can help to avoid or reduce the effects of natural disasters. The Santa Barbara chapter of the Plan (2012) identifies hazard vulnerabilities and pre-planning measures for the City.

This has relevance to future climate change adaptation planning because some climate change effects will involve changes to the timing, frequency, and intensity of weather patterns that can result in more extreme weather events (rainstorms, winds, etc.) as well as greater potential for natural disasters (wildfires, flooding, etc.).

1.2.4 Other benefits of climate protection measures

In addition to providing climate protection, actions that reduce carbon emissions have other community benefits, including economic, security, resource, and public health benefits.

Cost savings

Actions by governments, businesses, and individuals to reduce carbon emissions in many cases have up-front costs, for example for installing more energy-efficient equipment. These costs can be a serious constraint to proceeding with such measures. However, over the longer-term, such costs may pay for themselves with operational cost savings resulting in overall cost savings.

Recent examples from government, institutional, and business operations in Santa Barbara demonstrate the type of cost savings that can occur (*Public Works Department and 2010 Sustainability Achievement Report*):

- Energy efficiency audits and retrofits of City of Santa Barbara facilities resulted in savings of almost \$400,000 in annual operations costs.
- Solar energy panels installed at the City of Santa Barbara Corporate Yard generate 87% of the electricity needed for Community Development, Public Works, and Parks operations.
- The Santa Barbara School District waste recycling and composting program has diverted 56% of waste from landfill disposal, saving an estimated \$90,000 per year in disposal costs.
- Shoreline Café estimates an annual savings of \$15,000 due to energy management changes and retrofits.

Cost savings would accrue to individual homes and businesses throughout the community from instituting similar types of measures, as shown in the following example estimates (from *2010 Sustainability Achievement Report and City Water Resources Division*)

Figure 1-3 Energy efficiency cost savings examples		
Average home electricity use		
	Annual electric use (est.)	Annual electric bill (est.)
Energy inefficient home	8,500 kWh	\$ 1,200
Energy efficient home	4,250 kWh	\$ 600
Cost savings		\$ 600/ year
Average home and landscape water use		
	Monthly water use (est.)	Monthly water bill (est.)
Water inefficient home	30,000 gallons	\$ 203.00
Water efficient home	9,000 gallons	\$ 69.50
Cost savings		\$ 1,602/ year
Restaurant – typical waste		
	Waste diversion (est.)	Monthly collection bill (est.)
Trash collection only	0 %	\$ 475
Recycling, composting, & trash collection	67 %	\$ 200
Cost savings		\$ 3,300/ year

Other economic and jobs benefits

Programs and actions that reduce carbon emissions may also generate new businesses and jobs that benefit the community and local economy. Examples are research and production of new technologies, retrofitting existing buildings for energy efficiency; providing local renewable energy sources (e.g., solar, wind, wave, geothermal, waste-to-energy); providing alternative travel products and services; providing sustainable agricultural and gardening services and products; and providing green building, recycling, and water conservation services and products.

California companies and universities have received substantial energy grant funding in recent years. Economic studies in California have concluded that incentives for industries to invest in new technologies can provide stimulus for new employment and growth.

Actions to benefit and preserve the local environment also act to help local economies such as tourism, recreation, fisheries, and agriculture.

Enhanced security

Fossil fuels are a limited resource and worldwide resources are considered to be declining, with remaining resources more difficult and expensive to extract. At the same time, some large industrializing countries such as China and other Asian nations have increasing energy demands that are anticipated to increase competition for these scarce resources in coming decades, and drive up costs.

With about five percent of the world's population, the United States consumes about 20% of the world's energy use. Approximately 63% of U.S. oil demand is supplied from foreign imports (more than 3 billion barrels imported annually), some from regions that are politically unstable.

Climate protection measures that conserve electricity and vehicle fuels, or use alternative energy sources such as solar energy, have the added community benefits of reducing our dependence on foreign sources of fossil fuels, and conserving our own oil and gas resources and supplies for a longer period.

Resource benefits

Energy conservation, water conservation, and waste reduction/recycling measures that reduce carbon emissions also have the individual and community benefits of conserving those energy, water, and material resources, as well as landfill capacity for waste disposal.

Conserving limited resources and avoiding waste is a key component of local community sustainability. Sustainability means the wise use of resources in a way that does not damage future generations, and also allows for local reliance in the face of natural disasters.

Public health and quality of life

Carbon emissions reduction measures also have the individual and community benefits of reducing air pollutants and improving air quality.

Some measures that make it easier to use alternatives to a single-occupant vehicle for transport have added individual and community health benefits from increased physical activity. Examples include measures increasing the connections of walking and bicycling routes, and mixed use (commercial/residential) development patterns that put residential uses within walking distance of daily business, shopping, and recreational locations.

Actions that reduce energy use, air pollution, water pollution, traffic, and noise all benefit public health as well as quality of life in a community.

Figure 1-4 Example measures individuals can take to reduce carbon emissions
Electrical energy reduction
Turn the water heater thermostat down to 120°.
Turn lights off when leaving a room, and unplug items not in use or use a power strip to cut power (<i>20% of home electricity use is items that are turned off</i>)
Keep drapes open in winter daylight to let sunlight heat home; closed in summer to cool and closed after sunset in winter to retain heat
Set the thermostat as low as comfortable in winter, and as high as comfortable in summer; close heating and air conditioning vents in unused rooms
Check lighting needs and consider reducing the number and wattage of bulbs
Wash full loads of laundry and dishes, use cold water, and air dry when possible; use energy-saving settings on washing machines, clothes dryers, dishwashers, and refrigerators
Clean refrigerator condenser coils yearly
Use lighting occupancy sensors, timers, and dimmers
Upgrade to more energy-efficient appliances (refrigerator, etc.)
Install upgraded double-pane windows
Install solar photo-voltaic panels that generate electric energy
Do a home energy audit using electric utility on-line audit or arrange for a home visit audit.
Transportation
Drive less, & take fewer solo vehicle trips, by walking, biking, taking bus or train, carpooling
Use electronic means to accomplish some activities without a vehicle trip
Combine car trips for several purposes
Keep your car tuned up, and tire pressure up
Arrange to telecommute one day per week or more
Consider a hybrid, all-electric, or alternative fuel vehicle
Vegetation and green building & materials
Reduce the amount of paved area and increase the amount of trees and vegetated areas
Use natural materials, finishes, & paints with less off-gassing in new structures & furnishings
Incorporate passive heating and cooling in new structure and landscape designs
Offsets
Purchase offset emissions from organizations or companies, e.g. when taking flights or to offset other emission-generating activities

Figure 1-4 (continued) Measures an individual can take to reduce carbon emissions
Waste reduction and recycling
Use reusable mugs and shopping bags rather than disposable ones
Convert some activities from paper to electronic
Print double-sided documents to cut paper use in half
Maintain and repair durable items
Recycle most paper, bottles, cans, and plastic, as well as electronic items
Compost foodscraps and use for soil amendment
Purchase items made from materials with recycled content, and items that can be recycled
Water conservation
Check for leaks in both inside and outside water systems and have them repaired. Check toilets for silent leaks (drop food coloring or dye tab into tank, if color appears in bowl after 10 minutes, replace rubber flapper)
Sweep rather than hose walkways
Install water-efficient plumbing fixtures and appliances (such as shower-heads, sink faucets, toilets, clothes washers, and a timed, circulating water pump on the hot water heater)
Schedule your water softener to regenerate no more than twice a week
Reduce lawn size
Wash full loads of laundry and dishes
Take shorter showers, and turn off the water while brushing teeth
Water landscaping infrequently but thoroughly to increase root depth
Use water wise plants for landscaping, including native, drought-tolerant species
Use mulch or decomposed granite in landscaping to lock in moisture and reduce evaporation
Install a smart controller on a water sprinkler that adjusts watering based on weather, soil type, amount of sunlight, and plant type. Use online irrigation scheduling tools (weekly watering index, and landscape watering calculator) to adjust watering to the weather
Install a rain shut-off sensor to automatically stop sprinklers during and after a rain event
Adjust your sprinkler pressure to minimize misting and overspray. Switch your sprinkler heads to rotating nozzles to apply water slowly and evenly. Check and replace old sprinkler timer batteries
Retrofit overhead sprinklers to a drip irrigation system
Install a laundry-to-landscape gray water system to reuse wash water for irrigation
Install rain barrels or cisterns to catch rainwater to irrigate your landscape
Water plants in the early morning or evening to reduce evaporation
When washing your car, use a bucket instead of a running hose. Wash it on lawn to contain runoff